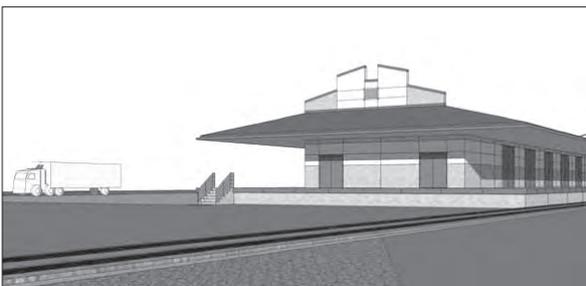


# ARXX ICF Government Buildings and **MILITARY**

## Structures



LEED®  
green  
energy efficient  
environmentally conscious



## per·for·mance

noun |pə(r)-fər-mən(t)s|

What buildings built with ARXX ICFs experience at the highest levels for the life of the facility:

- 1 Energy efficiency,
- 2 Big savings on heating and cooling costs, and
- 3 Safety and security.
- 4 **Redefining building.**



**ARXX™ ICF**  
Redefining building.

# Built to outperform.

Government and military buildings must be built to meet increasingly challenging design criteria that encompass energy-efficient green building technology and force protection design standards, while being cost-effective to build.

Designing a safe and secure government or military building requires the use of construction materials that will outperform standard building code criteria. Making that building energy-efficient and cost-effective sets an even higher threshold. In fact, these buildings must meet the Unified Facilities Criteria (UFC) of the United States Department of Defense (DoD) including all US military services.

## UNIFIED FACILITIES CRITERIA

The Unified Facilities Criteria was created to unify all technical criteria and standards pertaining to planning, design, construction and operation, sustainment, restoration, modernization and maintenance of real property facilities, and applies to the Military Departments, the Defense Agencies and DoD Field Activities.

### Minimum Antiterrorism Standards (UFC 4-010-01)

This criteria represents a significant commitment by DoD to seek effective ways to minimize the likelihood of mass casualties from terrorist attacks against DoD personnel in the buildings in which they work and live.

### Design of Buildings to Resist Progressive Collapse (UFC 4-023-03)

This criteria provides the design requirements necessary to reduce the potential of progressive collapse for new and existing facilities that experience localized structural damage through normally unforeseeable events.

Designing with ARXX ICFs can meet UFC Minimum Antiterrorism Standards and Design of Buildings to Resist Progressive Collapse criteria. A building constructed with ARXX ICFs retains its structural integrity, thereby protecting the occupants of the building, even in extreme circumstances.

**The Energy Independence and Security Act requires a 55% reduction in energy use by 2010 and a 100% reduction by 2030 (compared to the 2003 baseline) for all federal buildings. That's a tall order, but ARXX insulating concrete forms (ICFs) can uniquely provide a solution.**

The ARXX wall system can be designed and detailed to provide adequate levels of continuity, redundancy and ductility, so that alternative load paths can develop and be transferred following the loss of an individual support member. These characteristics would also be applicable for buildings designed to meet seismic design methodology, even in the highest seismic zones.

## FORCE PROTECTION DESIGN STANDARDS

Accommodating the need for security and antiterrorism is a significant concern for all military design. Security and antiterrorism requirements must be integrated into the total project. Design elements should be utilized to provide visual harmony with the main facility, producing architectural compatibility through consistent use and application of materials, forms and colors.

All design decisions involving security and antiterrorism requirements require coordination among the design disciplines including land planners, landscape architects, architects, intelligence personnel, security personnel, force protection officers, facility users and engineers.

The inherent structural properties of an ARXX ICF wall assembly make it an ideal solution for the construction of any State Department, DoD, military or General Services Administration

(GSA) building application.

Where building hardening is required, ARXX walls can be designed and constructed to mitigate threat hazards where standoff distance

is limited. ARXX ICFs provide superior force protection due to the composite action of the reinforced concrete core and the compressive nature of the EPS, which dampens the force of the air blast and spreads the force over the face of the concrete.

ARXX ICFs provide a reinforced concrete wall building envelope solution that meets and surpasses Force Protection Design Standards while providing high energy efficiency that can significantly lower operating costs, with additional benefits that save time and money in the construction phase and lower the overall cost of ownership.

- Highly energy-efficient wall assembly.
- Significantly reduced operating costs to heat and cool buildings.
- Decreased capital costs to scale HVAC requirements.
- Significant contribution to LEED points.
- Safe and secure – blast resistant and bullet proof.
- Meets Unified Facilities Criteria (UFC) which includes Minimum Antiterrorism Standards for Buildings.
- Contributes to meeting the Design of Buildings to Resist Progressive Collapse criteria.
- Faster, easier build.
- Integrates with any floor or roof system.
- Smaller land footprint required when designing with ICFs due to the blast resistant nature of ICFs.
- Light weight material for easy handling – no special heavy lifting equipment required.
- Assemble-on-site product available for easy transportation to remote locations.
- Flexible space planning.
- Safety from severe weather events - can withstand hurricanes, floods and tornado force winds.
- Can be engineered for the highest seismic zones.
- Better indoor air quality by controlling sources of contamination.
- Provides four hour fire resistance.
- Superior sound attenuation. nt capital

# The benefits.

## ENERGY EFFICIENCY EQUALS REDUCED OPERATING COSTS

The reduced operating costs attributable to the energy efficiency of the ARXX ICF wall assembly can be significant and used to supplement other budgets and needs. As well, the high energy efficiency of the building can allow HVAC systems to be scaled, reducing the upfront capital costs.

The energy effectiveness of an ARXX ICF wall is due to three important factors: continuous interior and exterior thermal envelope, reduced air infiltration and thermal mass moderation. ARXX ICF walls moderate indoor temperature swings and reduce the amount of heating and cooling needed.

## INCREASED FIRE RESISTANCE

Walls built with ARXX ICFs have a four hour fire resistance rating and readily meet the

most stringent building code requirements for flame spread and smoke development indices, which means that an ARXX wall system meets non-combustible construction standards.

## SAFE AND SECURE

An added value of building with ARXX ICFs is the structural superiority provided by the wall system. The design of ARXX cast-in-place reinforced concrete walls allows the concrete to cure 25% stronger and with appropriate design, can lessen the effects during an explosion and retain structural integrity immediately following a blast to allow for evacuation. This superior strength provides safety from extreme weather events and ARXX walls can withstand hurricane and tornado force winds as well as being engineered for the highest seismic zones, or to provide a safe room to FEMA shelter performance standards.

**W**hat are ICFs? Insulating concrete forms (ICFs) create cast-in-place, reinforced concrete walls that are more than just highly energy efficient.

## SUPERIOR SOUND SUPPRESSION

The high STC ratings provided by ARXX walls allow multiple uses and more efficient designs with fewer restrictions on space due to the sound attenuation qualities. A high noise area can be designed next to a quiet zone without concern of noise disruption. This can facilitate multiple uses of space and better access and comfort levels for occupants.

## FASTER, EASIER BUILD WITH LIGHT WEIGHT MATERIAL

ARXX forms are lightweight, easy to transport and easy to handle on the job site. They do not require special heavy lifting equipment for installation. The ARXX wall provides not only the structural mass, but also the insulation, vapor barrier, air barrier and furrings for the attachment of interior and exterior finish materials. A standard ARXX form provides the square footage equivalent of six masonry blocks. The combination of these elements, results in a reduction in construction costs and subtrades required on site, and shortens construction schedules.

## FEDERAL HIGH PERFORMANCE AND SUSTAINABLE BUILDINGS

The Federal Government is the USA's single largest landlord and energy consumer, operating more than 500,000 facilities comprising more than three billion square feet. Approximately \$30 billion is spent annually on acquiring or substantially renovating Federal facilities, and about \$7 billion is spent on energy for Federal facilities. This footprint represents an enormous opportunity to transfer sustainable technologies and practices on a large scale, thereby helping to transform the marketplace and create a more healthy work environment. ARXX ICFs can not only significantly lower the operating costs to heat and cool buildings by providing a wall system that is highly energy efficient, but building with ARXX ICFs is cost-effective and fast, and can help buildings meet the stringent federal standards for increased energy efficiency.

### Brigade Cargo Ammunition Loading Facility

*McAlester Army Ammunition Plant (MCAAP) McAlester, Oklahoma*

MCAAP has six ammunition production, maintenance and renovation complexes and is a major ammunition storage site for all branches of the Armed Forces. With nearly 2,300 storage magazines and six million square feet of covered explosive storage space, it is the DoD's largest explosive storage facility. ARXX ICFs were used for the construction of a new ammunition loading facility.

### Fort Greely - Fairbanks, Alaska

Home of the Cold Regions Test Center (CRTC), Fort Greely was originally established as a refueling point for aircraft en route to Russia. Today, Fort Greely serves as an integral part of the USA's Ballistic Mission Defense System (BMDS) as a launch site for anti-ballistic missiles and is a National Security Asset.

ARXX ICFs were used in the retrofit of an existing sally port (vehicle inspection station) with a two story building addition to house rest rooms and administrative offices for the 49th battalion, and the Fire Ready Facility - a building with a large meeting/briefing area, rest rooms, kitchen area, etc. to house soldiers of the 49th battalion - built just 4" away from the sally port retrofit.



The use of ARXX ICFs in existing government and armed forces structures has proven that ARXX is suited to the construction of: administrative facilities, single family housing, multi-story barracks (UOQs), mess halls, recreation facilities, training facilities, commissary facilities, weapons and ammunition production facilities and forward command posts.

To learn more about how we can help you with your military project go to

[arxx.com](http://arxx.com) or call 800.293.3210



# RXX ICFs Contribution to LEED Credits

LEED NC 2009 • LEED Core and Shell • LEED for Schools

**ARXX ICFs contribute significantly to LEED points.**

Based on the data shown on the LEED Credit Summary table, building with ARXX ICFs can contribute significantly to the LEED points for your project. Actual LEED point contribution will be project specific, and should be determined by a LEED Accredited Professional for each project seeking LEED accreditation.

LEED Section	LEED Credit	LEED Points	Relevant benefits of ARXX ICFs
Sustainable Sites	SSc5.1 - Site Development: Protect or Restore Habitat	1	Enabler - On a greenfield site this credit can be achieved by limiting site disturbance around the building perimeter (plus roads, trenches and other constructed features). ARXX ICF wall systems are typically braced from the interior. Accordingly, they allow minimal excavation area, enabling reduced site disturbance around the building perimeter.
	SSc7.2 - Heat Island Effect, Roof	1	Indirectly Enhanced - ARXX wall systems are capable of withstanding higher structural loads and could support the added load of a green roof. A green roof can reduce heat island effect and bring more natural spaces into an urban location.
Energy and Atmosphere	EAp2 - Minimum Energy Performance	Prereq 2	Contributor - The credits for energy performance relate to energy use of whole building. Use of ARXX wall systems can directly contribute to energy reduction.
	EAc1 - Optimize Energy Performance	Up to 19	Contributor - The credits for energy performance relate to energy use of whole building. Use of ARXX wall systems can directly contribute to energy reduction by providing superior air tightness, insulating value and thermal mass benefits.
Material and Resources	MRC2 - Construction Waste Management	Up to 2	Enabler - The credits for ensuring debris from construction is recycled or redirected back to the manufacturing process. The nature of ARXX wall systems is such that very little waste is produced during construction, and what is produced can typically be fully recycled. ARXX can be a zero waste system.
	MRC4 - Recycled Content	Up to 2	Enabler - ARXX ICFs contain between 25% to 50% recycled content material. Rebar typically has greater than 90% recycled content. Additional benefits are achieved by use of concrete products that substitute part of the Portland cement content with supplementary cementing materials (SCMs) such as fly ash, slag and silica fume.
	MRC5 - Regional Materials	Up to 2	Contributor - 80% of a material must be locally manufactured (within 500 mile radius) to qualify under this credit. ARXX currently has 11 manufacturing facilities throughout North America; concrete itself is locally manufactured.
	MRC8 - Durable Building (Canada only)	1	Enabler.
Indoor Environment Quality	EQc3.2 - Construction IAQ Management Plan: Before Occupancy	1	Enabler - ARXX ICFs do not deteriorate indoor air quality. They are insignificant contributors to VOCs, particulates, formaldehyde, carbon monoxide and 4-PC. Accordingly, they can help lead to a pass of the air testing required for this credit.
	IEQp3, IEQc9 - Acoustical Performance (LEED for Schools)	1	Contributor - ARXX ICFs have superior acoustic properties, providing sound attenuation rates at or over the minimum requirement levels of STC 50.
	IEQc10 - Mold Prevention (LEED for Schools)	1	Enabler - ARXX ICFs are mold, mildew and rot resistant unlike building materials such as wood and cellulose based alternatives. ARXX ICFs can therefore contribute to the required IAQ management plan related to mold.
Innovation and Design	IDc1 - Innovation in Design	Up to 5	Contributor to the LEED reward points for exemplary performance when projects achieve an additional level of performance on other LEED credits. The use of ARXX ICFs can contribute or enable many LEED credits in this category. Primary examples of how ARXX ICFs can contribute include: <ul style="list-style-type: none"> <li>Acoustic performance: innovative strategy to provide acoustical privacy.</li> <li>Air leakage: not readily measured in most energy simulation tools. Benefits include energy use reduction. Reduced risk of mold and improved occupant comfort.</li> <li>Thermal mass: not readily measured in most energy simulation tools. Can also contribute to occupant comfort.</li> <li>Security and durability: high mass concrete will provide superior resistance to excessive loads possible during extreme weather events or explosions.</li> <li>Recycled content: contribute to achieving exemplary performance.</li> <li>Regional materials: contribute to achieving exemplary performance.</li> <li>Waste reduction: contribute to achieving exemplary performance.</li> </ul>
Regional Priority	Regional Priority	Up to 4	Regional priority credits are identified by the USGBC from the existing set of LEED credits noted above. They represent additional credits that are deemed more important for the specific region in which the project is located. As they are drawn from the current set of LEED credits, ARXX ICFs can contribute to regional priority credits.